Manual
BOSS Kit Pro Farina

380100 • 05/2014

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1. INTRODUCTION

This solar milling system is a complete equipment. It offers an affordable system based on solar energy to facilitate an appropriate cereal/food processing technology for the benefit of smallholder farms, rural communities, cooperatives or projects in places where there is not electrical grid. The solar mill guarantees the possibility to obtain flour from different kinds of most common cereals (maize, wheat, barley, teff, millet, rice...) directly from the sun energy, so not electric or fuel bills are involved anymore. The equipment as a whole can be described as follows: 1. the stone mill; 2. photovoltaic array; and, 3. control panel. With our electrical stone mill, flour can be easily obtained from raw cereals. The stone mill is based on pure granite 500 mm stones and equipped with standard triphase asynchronous motor 230/400 V 50 Hz. This machine, made in the EU, is CE certified. The photovoltaic array supplies the necessary energy to run the stone mill. It consists of 7 solar panels (128 W each) with a total power of 896 W. A hot dip galvanized structure holds the solar panels. The control panel links the photovoltaic array to the stone mill. The equipment works without batteries. However during sunless hours the equipment is capable to work directly through single phase 230 V source, i.e. a generator (2 KVA minimum, not included). You will need little time to set up all the elements to start milling.

Please follow step by step this user's manual.

2. Items Supplied/Packing List

BOX 1 of 2 / Measures: 960 x 780 x 1365 mm / Volume: 1 m^3 / Weight: 223 kgs

Qty	Description
1	Horizontal stone Mill, 1HP 3 x 230/400 VAC, 50 Hz. 50 mm stone diameter
1	Control panel, solar/generator/mains input, Ref. SMCP11
1	User manual
1	Wooden box, measures 960 x 780 x 1365 mm

BOX 2 of 2 / Measures: 1635 x 1072 x 665 mm / Volume: 1,16 m^3 / Weight: 252 kgs

Qty	Description
7	Solar panel, Thin-film technology, 128 Wp first quality brand
10	Horizontal rail 41/41 x 1500 mm, for structure
3	Vertical triangle rail, pre-mounted 20º, for structure
1	Vertical triangle rail, pre-mounted 20º, with electrical box fixed, for structure
8	Rail unions, for structure
12	Panel clamps, for structure
4	End panel clamps, for structure
8	Allen screw with nut rail, for structure
1	Electrical cable to Control Panel to photovoltaic array, 25 m, blue plugs
1	Electrical cable to Control Panel to Stone mill, 5 m, red plugs
1	Earth bar with earth cable
1	Pack of fuses 10amps, spare part
2	Wrench key nº17-13 mm
1	Allen key nº8
1	Allen key nº6
1	Metric tape, 5 m
1	Masonry hammer to maintain the granite stones
1	Pack of nylon cable tie, 100 units
1	Wooden box, measures

TOTAL WEIGHT: 475 Kgs
TOTAL VOLUME: 2,16 m^3

Total kits per dry 20" container: 10 units
Total kits per dry 40" container: 20 units

3. Important Notice:

1. Heavy equipment. The stone mill is heavy. Take the considerations to its placement.
2. Solar panels are sensible, handle with care.
3. Note that solar panels produces electrical energy.

For your safety:

All the equipment is protected against the following situations:

- Short-circuits.
- Lightings.
- Over/under current.
- Over/under voltage.
- Empty running mill stone.
- It has emergency STOP in the mill.
- All the equipment is connected to earth.

4. Structure assembly

4.1 Elements

Horizontal rail
41/41x1.500mm
Ref. 444242

10 units

Vertical rail, triangle
Pre-mounted, 20º tilt
Ref. 446451

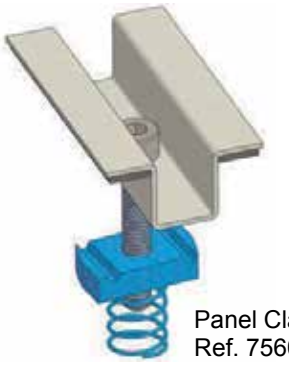
2 units

Rail unions
Ref. 444139

8 units

Vertical rail, triangle
with electrical box
Ref. 446452

1 unit



Panel Clamps
Ref. 756001

12 units

End Clamps
Ref. 756004

4 units

Allen screw
With nut rail
Ref. 756005

8 units

4.2 Assembly

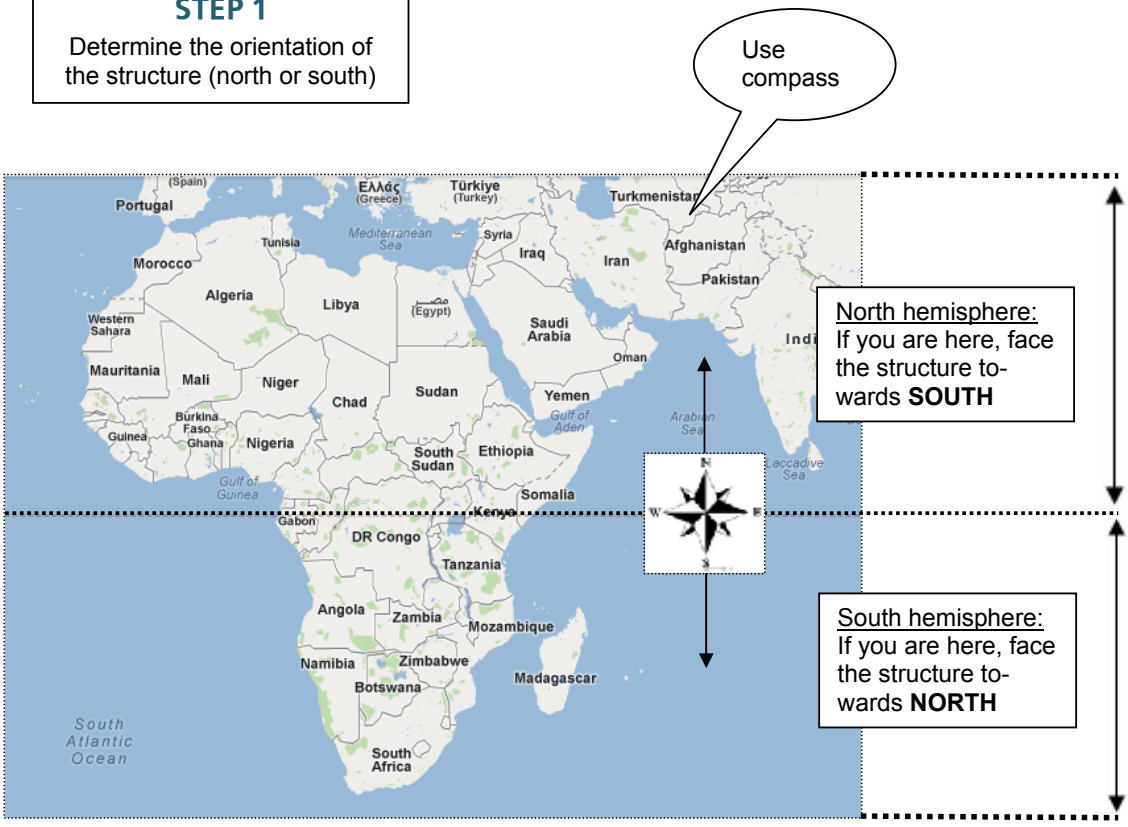
General View

Tools required:

- Metric tape
- Allen key, nº6 and nº8
- Wrench key, nº13 and nº17
- Compass

STEP 1

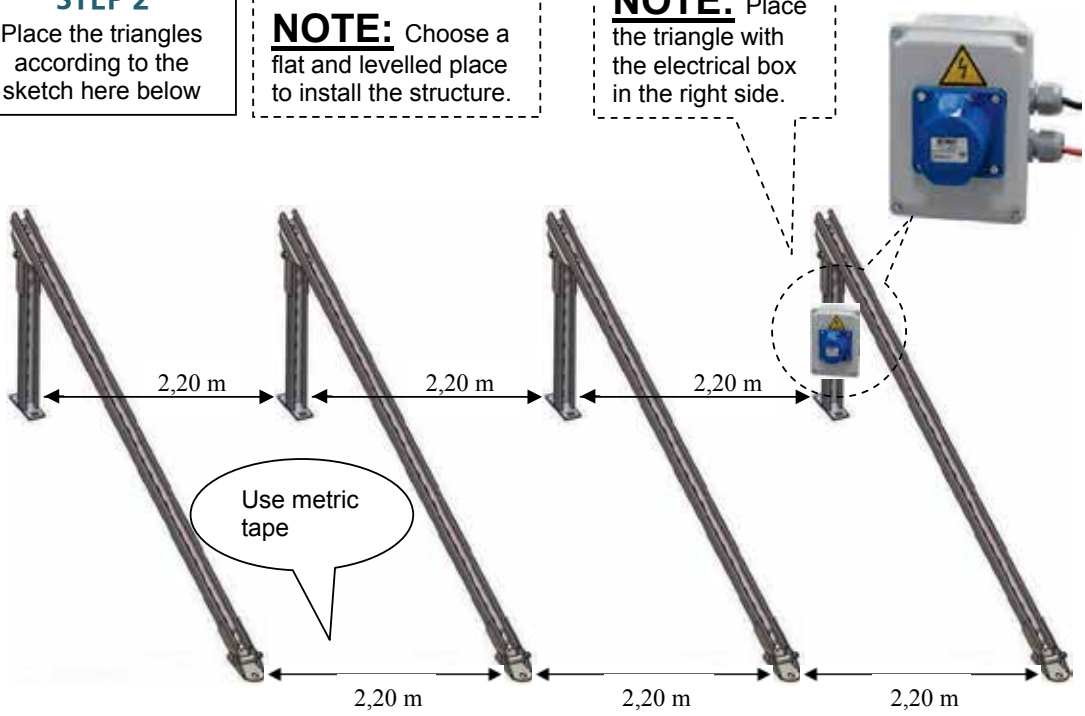
Determine the orientation of the structure (north or south)



STEP 2
Place the triangles according to the sketch here below

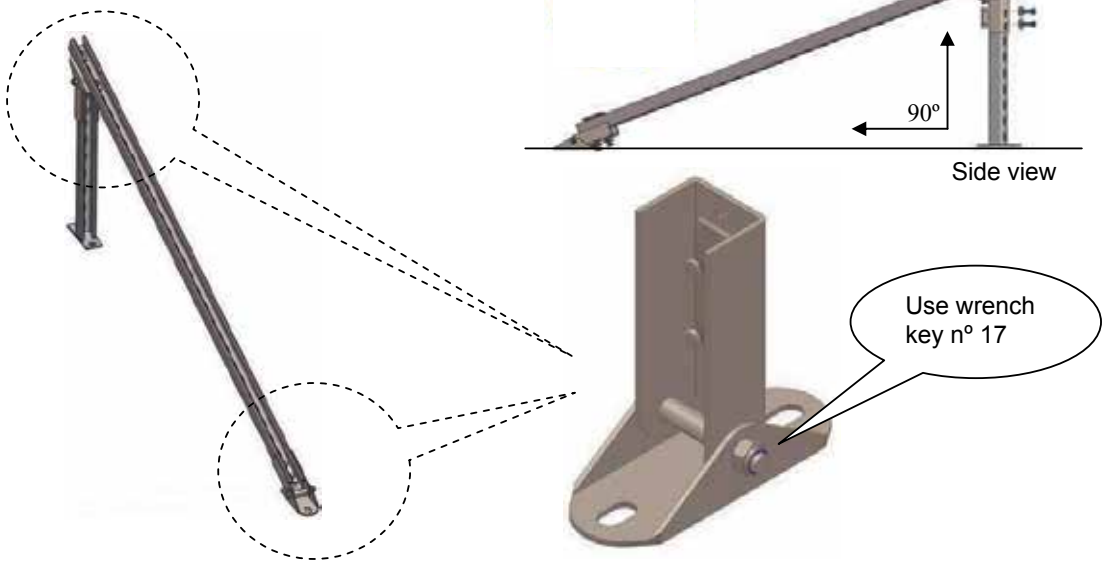
NOTE: Choose a flat and levelled place to install the structure.

NOTE: Place the triangle with the electrical box in the right side.

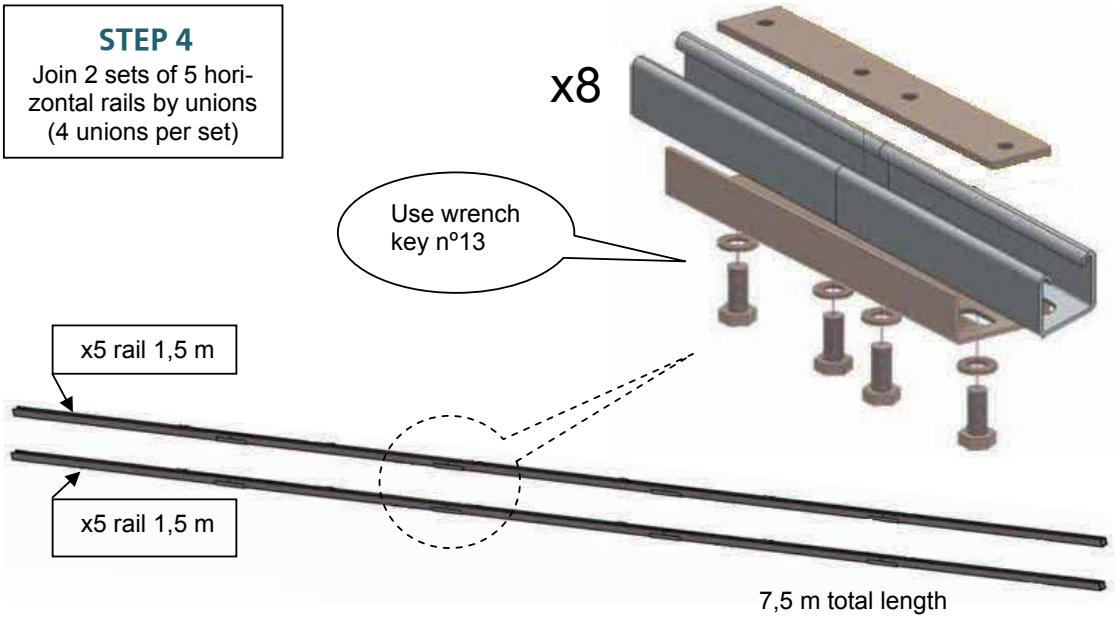


STEP 3
Tight the screws of the 8 jointed adjustable supports.

NOTE: The rear supports must be in vertical position, 90 degrees.

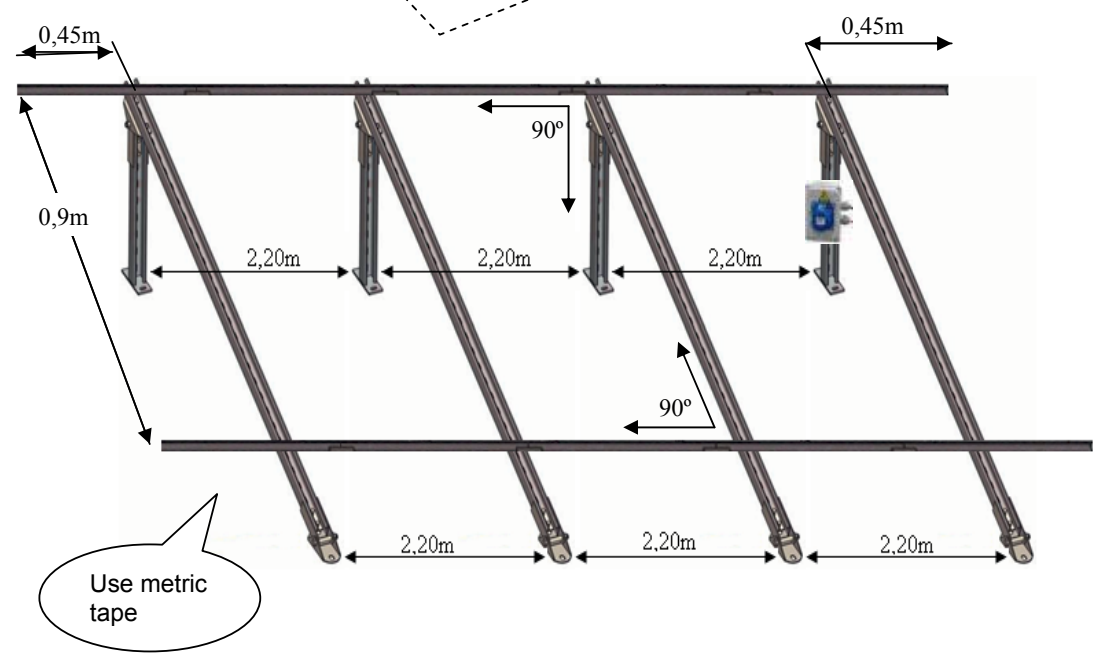


STEP 4
Join 2 sets of 5 horizontal rails by unions (4 unions per set)



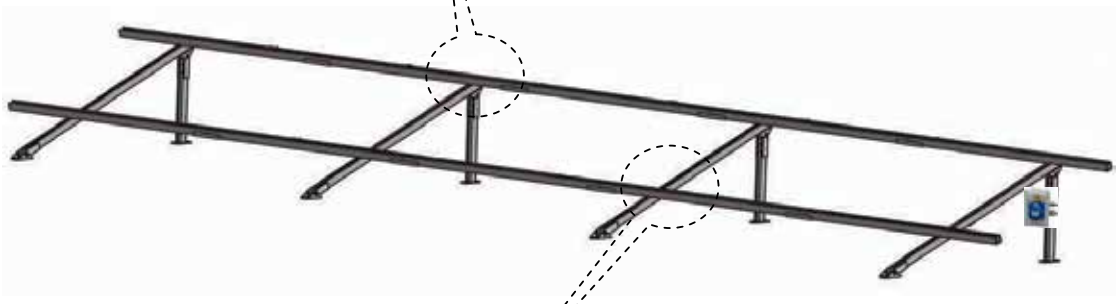
STEP 5
Place 2 horizontal rails on the vertical triangle rails

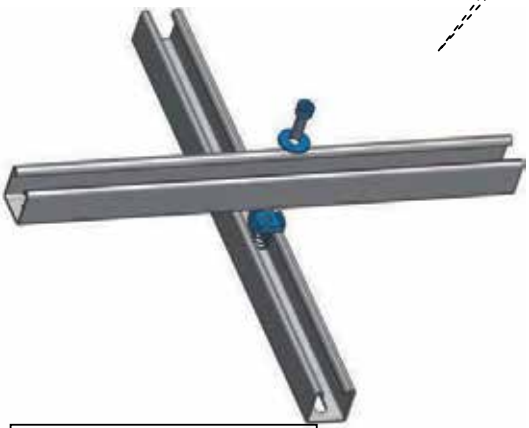
NOTE: Before to go in, pay attention to this sketch with measures and…



… go ahead!

Upper horizontal rail





Bottom horizontal rail

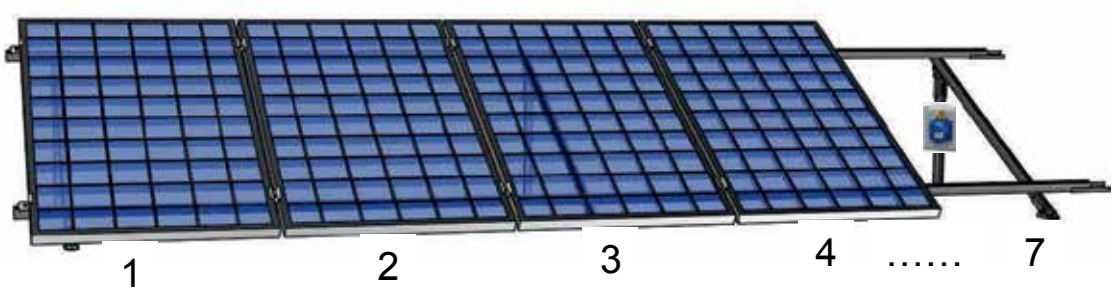
Use allen key n°8

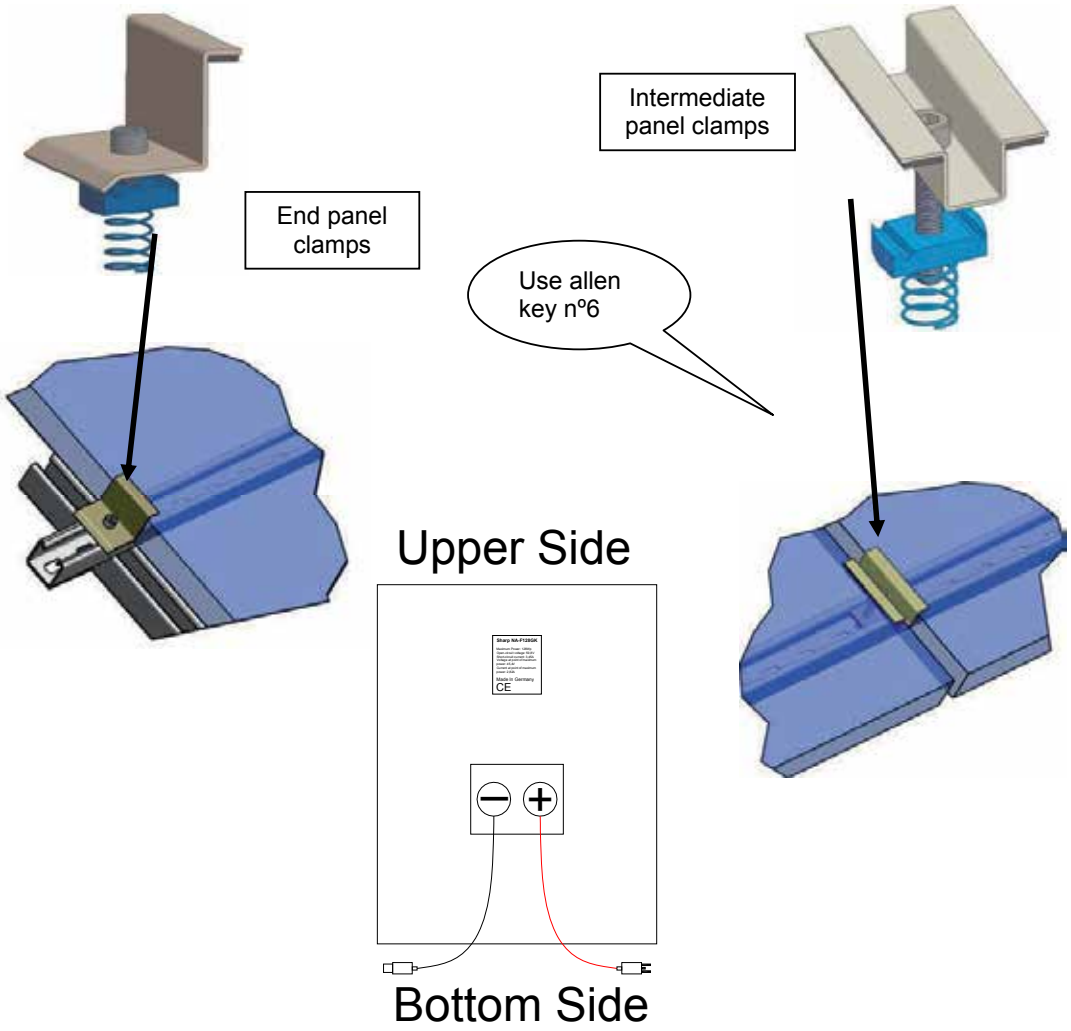
x8

5. Solar Panels placement

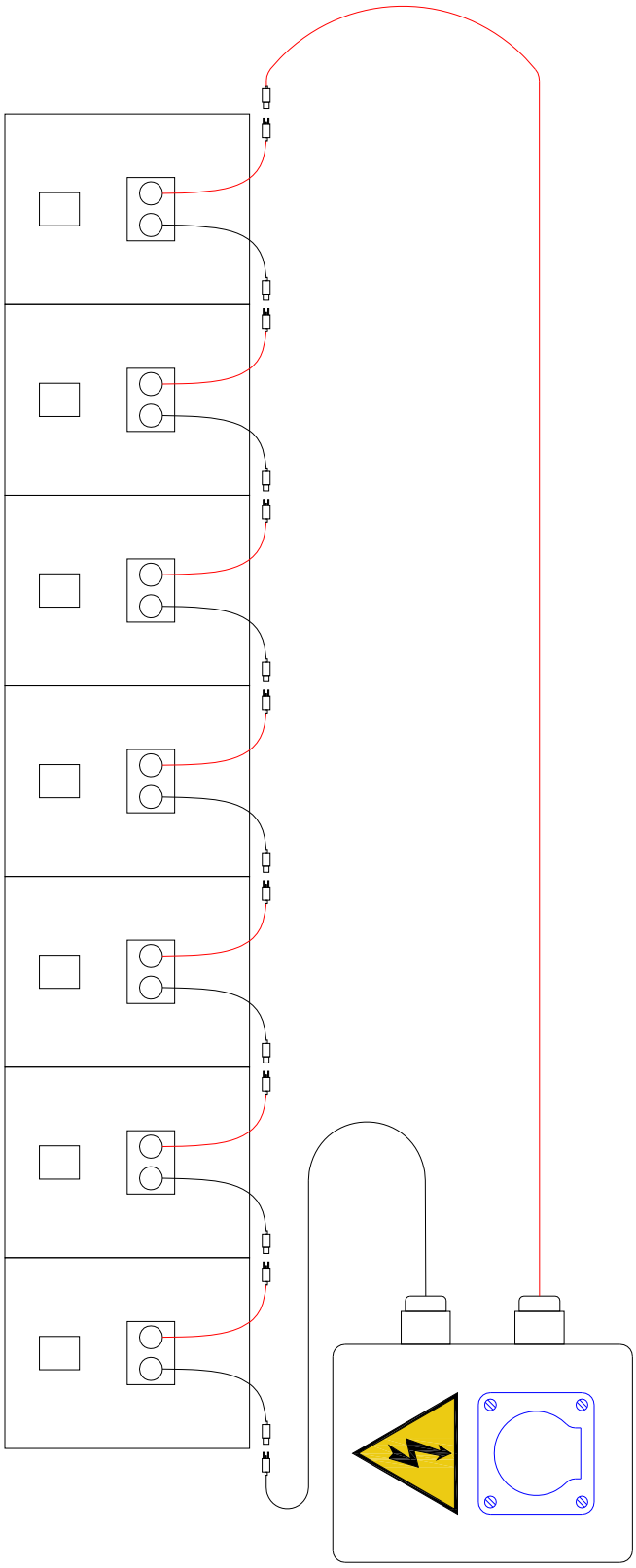
Place the solar panels using the clamps.

NOTE: Start the operation placing the first solar panel in one of the sides (vertical position).
Before placing the solar panels be aware to insert the solar panel with the label upside.



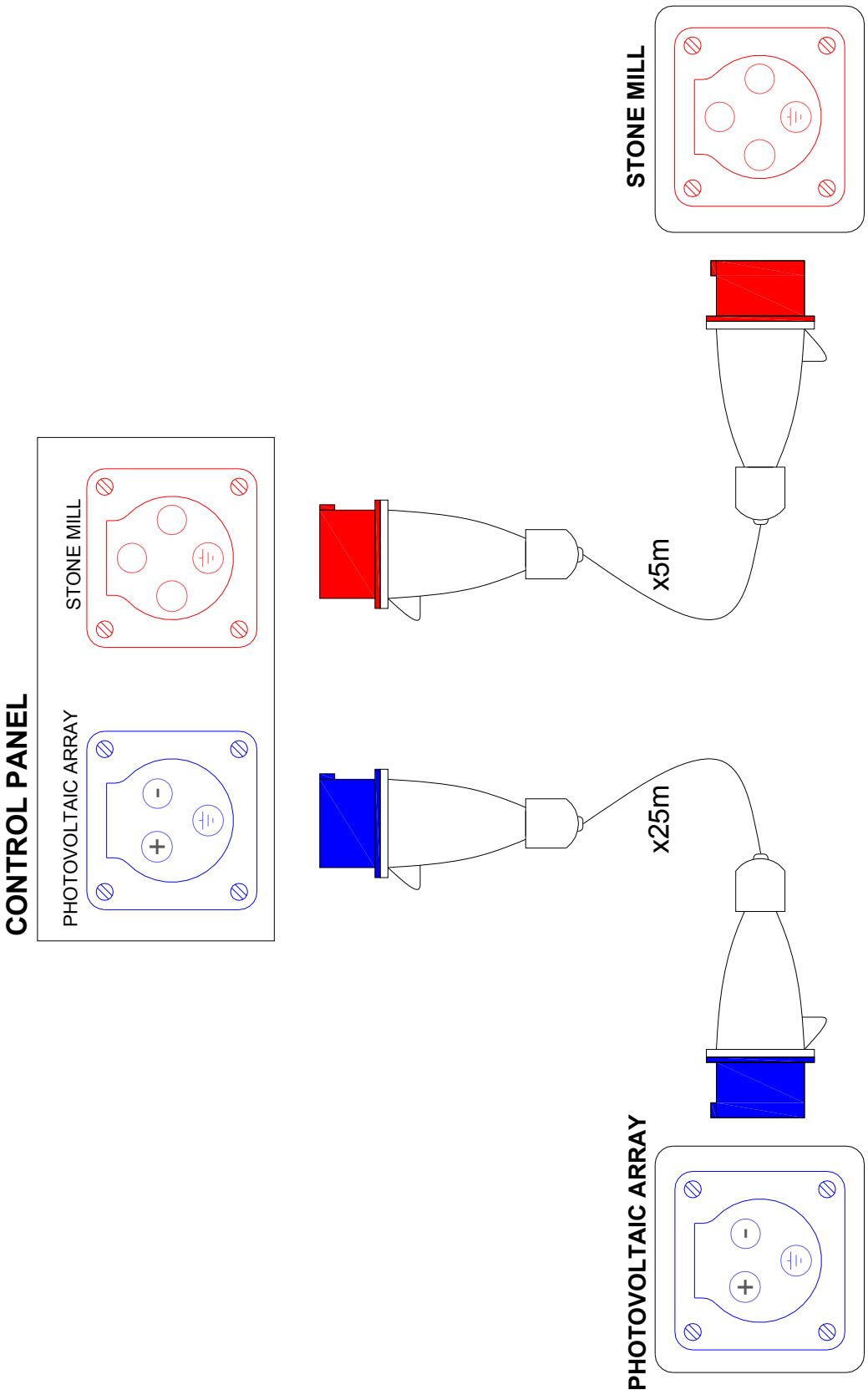


6. Photovoltaic Array wiring sketch



(Use nylon cable ties to fix the cable in the structure)

7. General Wiring Sketch

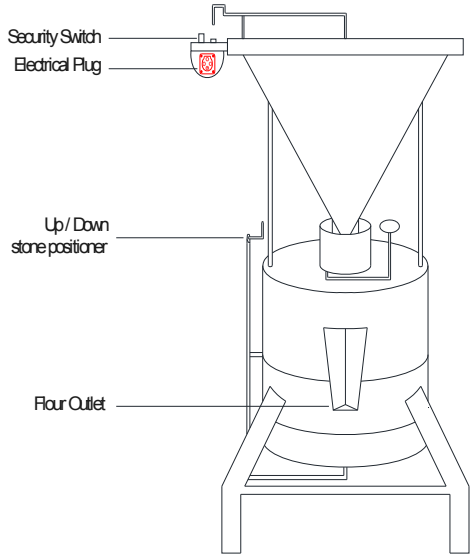


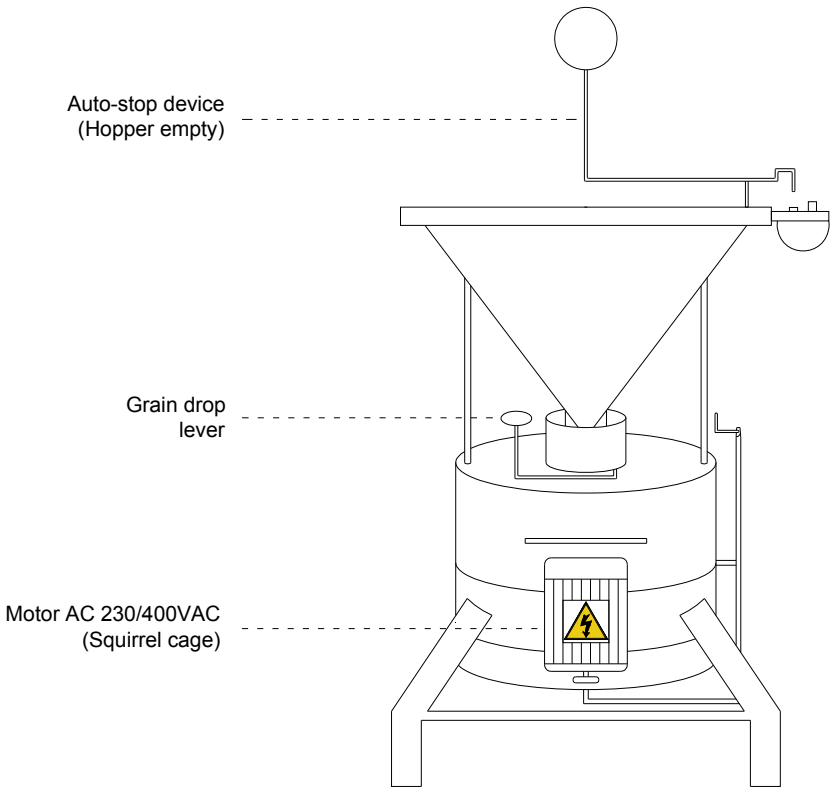
8. Stone Mill start operation

8.1. Placement:

Place indoors.
Level the soil surface.

8.2. Parts:



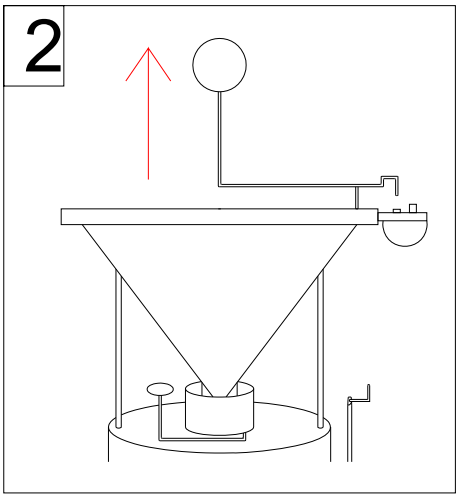


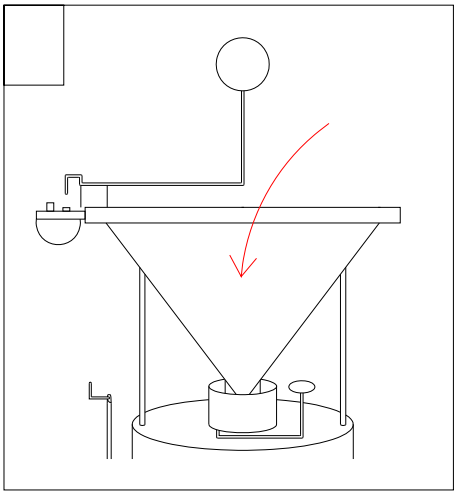
8.3. Milling Operation

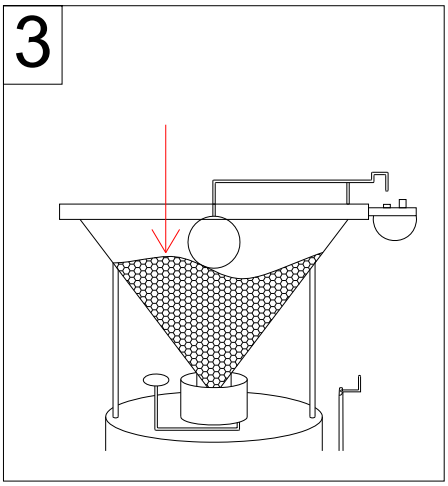
1. Lift the stopper device.
2. Fill the hopper with grain.
3. Down the stopper device above the grain.
4. Press the security switch On.
5. Up the stone using the stone positioner.

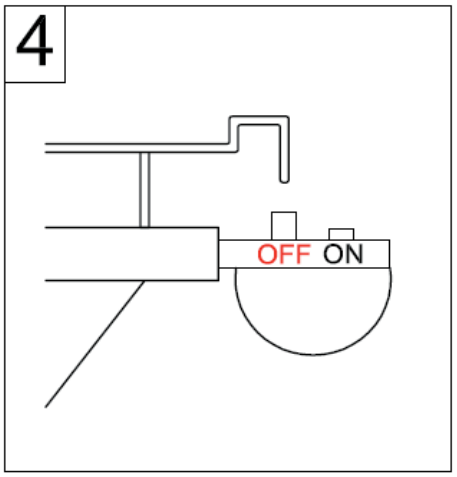
Starting up:

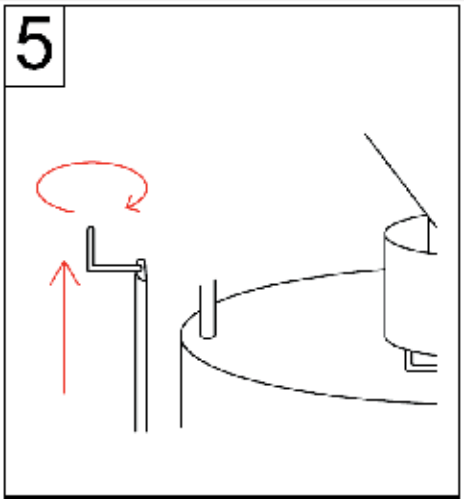
6. Select “Solar” mode in Control Panel switch.
7. When the stone rotate, lower the stone by the stone positioner.
8. Regulate the fineness of the flour desired by the dropping cereal ramp and stone position.

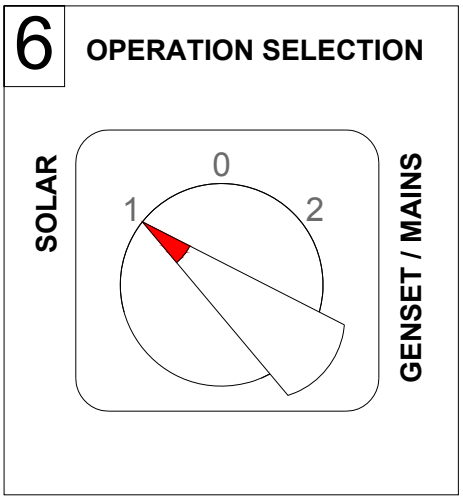


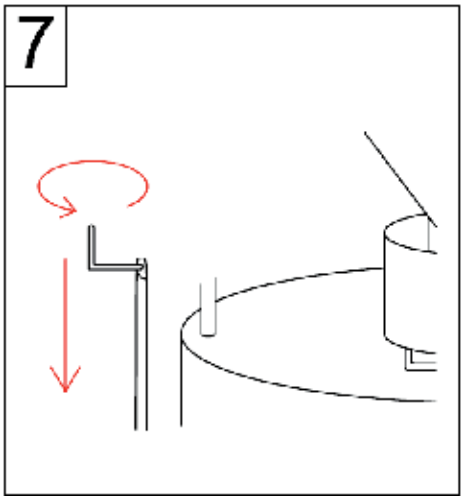


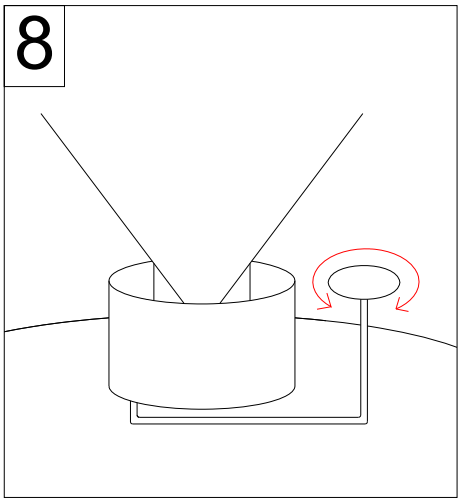












The stone full down and slow grain dropping results in fine flour.
To get coarser flour, lift the stone or increase the amount of grain entering the milling chamber.

When the hopper is almost empty the stopper device will switch off automatically.
This is to avoid stones useless friction without grain.

IMPORTANT NOTICE TO RE START THE SYSTEM:

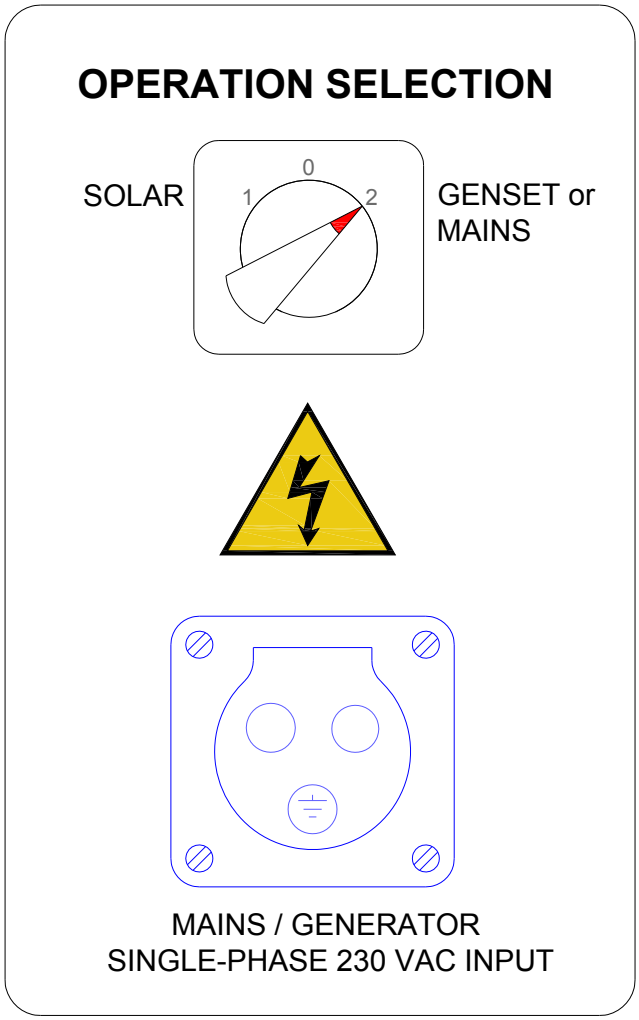
1) Switch position to 0 (control panel)
2) Lift the stone
3) Press On (mill)
4) Switch to solar or mains.
5) Operate the mill.

8.4. Alternative energy source operation

In some cases you might need to grind after daylight time or very dark clouds can reduce the performance of the system. A single phase 230 VAC/1 KW can be connected to the Control Panel.

- Electrical Grid: Just plug in 230 VAC and turn the Switch to “MAINS/GENERATOR” mode. The system will start operating.
- Generator: A generator with 230 VAC outlet (Minimum 2 KVA) can be plugged in the Control Panel.

Suggested procedure: Turn the Control Panel Switch to 0 mode. Start the generator and keep running till choke is removed (petrol engines). Then turn the Control Panel Switch to “MAINS/ GENERATOR” mode. The system will start operating.
Switch OFF: Always Switch OFF the switch in Control panel, then stop the generator.



9. General Maintenance

The installation requires no maintenance except regular array cleaning.

Photovoltaic Array:

- Cleaning the surface of solar panels and visual inspection.
- Try to locate the Photovoltaic Array in a place where shadows have the lowest possible.
- Recommended fence the Photovoltaic Array for more security.

Stone Mill:

- Locate the Control Panel indoors.
- Check the stone inside the mill if you detected low flour fineness.
- Check the belt below the motor. If it is loose, turn the handle up to tension it.

10. FAQ (Frequently Asked Questions)

Q: Can the buyer install himself the system?

A: *Yes, the equipment is supplied pre-mounted and can be set up easily within 1H 30m just following this user manual provided.*

Q: What is the lifespan of the solar modules?

A: *The solar modules are high quality brand and as per manufacturer specifications, 90% of power peak performance are guaranteed at 25 years.*

Q: What is the lifespan of the mill machine?

A: *Due its free maintenance the mill is a very long lasting machine. The mill itself is a very basic machine equipped with standard tripahse motor can be adapted and found in any market.*

Q: What about the stones?

A: *The stones are made from pure granite and most probably you'll never have to replace it. The machine has a stopper device to avoid useless stones friction without grain. Its recommended to work with the stopper device operating. In case of need to rough the stone faces, special masonry hammer is provided.*

Q: Are the spare parts available?

A: *Yes, all spare parts are available from the solar milling company, although some can be locally in any country.*

Q: At night time which kind of electrical source can be used?

A: *Single phase 230 V - 50 Hz, capable to supply 750 W.*

Q: is there any risk of electrical shock?

A: *No, all the connectors are isolated. You'll never be in touch with live electrical parts. The earth rod provided is highly recommended to be installed before the operation, to keep the entire equipment safe.*

Q: Which kind of cereals can be grinded?

A: *All dry cereals can be grinded in this mill. Wet grains can clog the stones and be not effective.*

Q: What happens when there is not enough solar radiation?

A: *The machine could not work at full performance or even stop due lack of enough power from the solar modules. In this case it would be better to wait for better radiation conditions o choose electrical Mains.*

11. Milling operation trouble chart

DEFECT	MAY BE CAUSED BY	REMEDY
Will not turn	No power supply	Check supply, ensure source of power is working correctly
	Too much fixed load	Disconnect power, check to see if over-feeding has caused a jam
Mill will not turn fast enough	Not enough power	Check if power source is working correctly
	Over-feeding	Reduce grain feed rate
Noisy operation	Worn bearing	Check bearing and replace or lubricate as required
Low output	Caking/blockageing in the mill	Dry grain it too wet
	Stones polished	Remove for resurfacing
Coarse grinding	Stones polished	Remove for resurfacing
	Inappropriate feeding	Adjust feeding device (smaller quantity)